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SHERBURNE WESLEY BURNHAM, 1838-1921

BY ROBERT G. AITKEN

A telegram from Professor Barnard brought us the sad news of the death of Professor Burnham in the early morning of March 11th. A fractured hip sustained thru a fall in his own home about two weeks earlier was the immediate cause of death, but it had been known to his friends that his health and strength had been steadily failing for several years. His faculties remained unimpaired, and a letter dictated to his daughter on October 28, 1920 (which I prize not only for its contents but because it was the only one he wrote or dictated, he says, "in half a dozen years") is as characteristic in its expression as any of those written in earlier years.

How Burnham's attention was first directed to astronomy I do not know, but he himself has told us that when he was in London, about 1861, he purchased one of the cheap astronomical telescopes introduced about that time. It had a 3-inch aperture and was, he says, a good instrument for landscape use, but of little value for astronomical purposes.

To quote directly from his own account:

"Some years later I obtained a 3¾-inch telescope, with an English object-glass mounted equatorially by Fitz on a portable stand. This was just good enough to be of some use, and poor enough, so far as its optical power was concerned, to make something better more desirable than ever. In 1869 I accidentally met Mr. Alvan G. Clark in Chicago . . . and made some inquiries of him about a small equatorial. This interview resulted in my ordering from the celebrated firm of Alvan Clark & Sons an equatorial of six inches aperture. I told them what I wanted, and what I wanted it for. Every detail was left entirely to their judgment, stipulating only that its definition should be as perfect as they could make it, and that it should do on double stars all that it was possible for any instrument of that aperture to do. In due course of time this instrument was delivered, and was set up in an observatory prepared for it in the meantime. My attention for some reason or other, which I am unable to explain, had been almost exclusively directed to double stars, previous to this, while using the smaller telescope referred to. This preference was not in any sense a matter of judgment as to the most desirable or profitable department of astronomical work, or the result of any special deliberation upon the subject. It came about naturally, without any effort or direction upon my part."¹

Mr. Burnham thus began his astronomical career as an amateur, with a six-inch equatorial as his instrumental equipment, and a copy of the first edition of Webb's *Celestial Objects for Common Telescopes* as the major part of his astronomical library. And an

¹Page vii of the Introduction to "A General Catalogue of 1290 Double Stars," by S. W. Burnham. *Publ. Yerkes Obs.*, Vol. I, 1900.

amateur he remained, it may be said, to the end, for he wrote in 1900, "with the exception of the four years, 1888-1892, all of this astronomical work, with the telescope and otherwise, has been done when eight or more hours of at least six days in the week were more or less occupied with other and very different affairs of life." He continued to hold his position as Clerk of the United States District Court in Chicago until about 1908, that is, to within about four years of the date of his retirement from the Yerkes Observatory.

The story of his remarkable achievements in the field of double star astronomy is familiar to every astronomer. He soon made his six-inch telescope one of the best known instruments in the world, and as early as 1873 his discoveries with it led the well known English amateur astronomer, the Rev. T. W. Webb, to write "what you have already done is so much more than any man now living has accomplished, that your high position as an observer is fully secured." Yale University recognized his work by giving him the honorary degree of A. M. in 1878. In the following year the Trustees of the James Lick Estate, on the advice of some of the leading astronomers of the country, selected him as the man preeminently qualified to test the atmospheric conditions on Mount Hamilton, which had been selected as the site for the Lick Observatory.²

Other honors came to him later, the Gold Medal of the Royal Astronomical Society in 1894, the Lalande Prize of the Paris Academy of Sciences in 1904, the honorary degree of Doctor of Science from the Northwestern University in 1915, and honorary membership in a number of astronomical and other scientific societies.

Burnham's first new double star (β_{40}) was found with the 6-inch telescope on April 27, 1870; by the close of the year 1874 he had sent to the Royal Astronomical Society five lists including 300 new pairs, of which 252 were discovered with this same telescope, erected in the yard of his residence in Chicago. In all, 451 new pairs were found with this famous instrument. Later he used larger instruments, and it is doubtful whether any other observer up to the present time has done successful visual work with so

²It is sometimes said that the selection of Mount Hamilton as the site of the Lick Observatory resulted from Burnham's report. This is not correct. The decision to build the observatory there had been made definitely by Mr. Lick himself, before his death in October, 1876, and the road to the summit, built by Santa Clara County to meet Mr. Lick's condition, was completed by the close of that year. Mr. Burnham's report, however, showed that this choice was a most fortunate one.

many different telescopes. He held positions successively, in the Dearborn, Washburn, Lick and Yerkes Observatories and in addition to the refractors at these institutions, varying from 12 to 40 inches in aperture, he used and discovered double stars with the 9.4-inch refractor at the Dartmouth College Observatory, the 16-inch of the Warner Observatory and the 26-inch of the U. S. Naval Observatory. In all, he had to his credit about 1340 new double stars and these include two classes of objects almost unrepresented in the earlier catalogs of the Herschels and Struves: pairs in which the two components are separated by distances of the order of only one-fifth of a second of arc and pairs in which one component is extremely faint, and close to a bright primary. He wisely set quality above quantity in cataloging new pairs, and the result is that his list of 1340 pairs has shown a higher percentage of binary systems in rapid orbital motion than any other even up to the present time.

But Burnham's work was not merely that of a discoverer. He made many thousands of measures of double stars, including pairs already known as well as those of his own discovery, and these measures are of inestimable value because of his extraordinary skill and because of the good judgment he exercised in making out his observing programs. These measures, collected in the *Memoirs of the Royal Astronomical Society*, the *Publications of the Washburn, Lick and Yerkes Observatories*, and in the *Publications of the Carnegie Institution of Washington*, together with the General Catalogue of his own double star discoveries, will remain as his enduring monument.

In his work of discovery Burnham at first found himself greatly handicapped by his lack of access to an astronomical library. "Objects were constantly being found which could not be identified in any of the books at hand for reference, the principal one being an early edition of Webb's *Celestial Objects*. At this time there were but few books in Chicago bearing upon the subject of double stars." Correspondence with other observers and queries in the columns of the *English Mechanic* afforded some assistance, but he felt the need of a complete catalog of all previous double star discoveries. With characteristic energy he proceeded to compile one by copying the records, borrowing the books needed, or visiting the libraries at Washington and elsewhere. "In this laborious way manuscripts were acquired of the material parts of nearly all publications relating to double stars." Later he accumulated a

very complete library of double star literature, but he kept his manuscript general catalog up to date by adding all new discoveries and also *all measures* of all double stars in the sky area north of -31° declination, this limit being chosen because it includes all stars than can be well seen from most of the northern observatories.

Shortly after its foundation, the Carnegie Institution of Washington, recognizing the great value of this work to all engaged in the study of double stars, agreed to publish it as No. 5 of their *Publications*. Mr. Burnham at once began a thoro revision of his manuscript, freeing it, as far as possible, from errors, collecting all available unpublished material and making, personally, nearly 10,000 additional measures of neglected pairs with the 40-inch refracting telescope of the Yerkes Observatory. It was characteristic of the man that he stipulated that the printing should be done in Chicago so that he could personally take all copy to the printer and call on him for all proofs. It required about five years to complete the revision of his manuscript and the printing of the work and his letters toward the end of this period express his great relief at having the material all in "cold type". The two large quarto volumes contain what is practically a complete history of every double star that had been recorded as such before 1906 in the sky north of -31° declination and the "G. C.", as the great *General Catalogue* is familiarly called, will always be an indispensable tool for every investigator of double stars.

Altho he was sixty-eight years old when this work was completed, Burnham had no thought of retiring on his well-earned laurels. He continued to go out to the Yerkes Observatory every week, winter and summer alike—rarely taking a vacation or missing his regular trips—and to use the great 40-inch refractor thru two consecutive nights, so far as weather conditions would permit. Such a program might well test the endurance of a much younger man, and in time it began to tell upon even his extraordinary vitality. Under date of October 16, 1908, he writes: "We have had a very mild and pleasant fall thus far. I shiver in anticipation of what is coming, since I get the full benefit of it all, not only at the Observatory, but getting there and getting away, the latter involving a three-mile walk, and, in the winter, breaking my own road. However, I ought to be pretty well used to it by this time—if I am ever going to be." But it was not until four years later that he was obliged to give up his work. In December, 1912, the

exposure to the severe cold proved too great a strain. On January 11, 1913, he writes: "I got upset for the first time in my life, and am still played out. I do not dare to go to the Observatory until I have more strength." As a matter of fact, I think he never went back.

In these later years he devoted his observing time largely to wider pairs and particularly to pairs in which one or both components were changing positions by their proper motion. At the same time, as he wrote in 1909, he was still "at work at the further perfection of the *G. C.*, in bringing things down to the latest date. Of course," his letter continues, "in many stars the real history starts at this point and the real use of the present material will commence long after I have closed the shutter for the last time. That is a matter which does not in the least worry or concern me."

The qualities that characterize Burnham's astronomical work, aside from his keenness of vision and his remarkable skill in the use of the micrometer, are thoroughness, independence of judgment, absolute sincerity and avoidance of the sensational. These are the qualities, too, which he valued in others. Thus, writing just after the death of Professor G. W. Hough, he says, "He never went into idle speculations where the maximum conclusions are deduced from the minimum facts. For more than 30 years I have admired his honesty and good faith in all scientific work." In another letter he speaks of "the reputation which I think I have of saying exactly what I think about astronomical subjects in the line of my work." Again he writes, "—not having been troubled with any superstition, astronomical or otherwise, and having no more faith in other people's observations than in my own, I have managed to steer clear of these sensations. By a little delay in rushing into print it becomes unnecessary to introduce anything wonderful or miraculous into the explanation. I have several unexplained things on hand now which would make good stories for the time being, but by the time I am thru with them I have no doubt everything will be simply and naturally accounted for."

In addition to his astronomical work, Mr. Burnham, as has already been noted, was thru nearly his entire life actively engaged in "practical" affairs, and it is sufficient evidence of his ability to hold his own in them that he retained his position as Clerk of the United States Circuit Court in Chicago until he had reached his seventieth year. Indeed it may fairly be said of him that he

excelled in whatever he undertook to do, whether in his work or in his recreation. In Chicago, a number of years ago, I found that a lawyer friend to whom I mentioned his name, knew nothing of Burnham, the astronomer but did know Burnham, the great bowler. Others knew Burnham, the amateur photographer, for he was an expert, "one of the best," says Dr. Campbell, "I ever knew." The observation and study of double stars, however, engaged his mind above all else.

- Burnham, the astronomer, will always be remembered as the one who "first developed the full power of modern telescopes in the discovery and measurement of double stars"; he will be remembered for his great catalogs of double stars; but it is Burnham, the man, who will be best remembered by all who came within the circle of his friendship. Simple and sincere, loving the truth and hating all pretence and sham, given to caustic speech but showing ever a kindly heart, a tireless worker and full of the joy of living, he was a rare comrade whose friendship made life a little better worth living.